

We claim:

1. An apparatus for plasma processing of a wafer, the wafer being disposed on a wafer holder during processing, the apparatus comprising:

5 an annular structure including a magnet, the structure concentric with the wafer holder, the magnet generating a magnetic field for deflecting charged particles incident on the structure, thereby preventing damage to the structure by said particles.

2. An apparatus according to claim 1, wherein the magnet comprises a magnetic material embedded in said structure.

10 3. An apparatus according to claim 1, wherein said annular structure is characterized as a ring, the ring having a groove formed therein, and the magnet is disposed in the groove.

4. An apparatus according to claim 1, wherein the magnet is a permanent magnet.

5. An apparatus according to claim 1, wherein the magnet is an electromagnet.

6. An apparatus according to claim 1, wherein said structure is of a material susceptible to erosion during the plasma processing, so that the magnetic field reduces said erosion.

15 7. An apparatus according to claim 1, wherein said structure is of a material selected from the group consisting of quartz, silicon, Y_2O_3 , silicon carbide and Al_2O_3 .

8. An apparatus according to claim 1, wherein the apparatus includes an electrode opposite the wafer holder, said annular structure is characterized as a ring, and the ring is a shield ring surrounding the electrode.

20 9. An apparatus according to claim 1, wherein said annular structure is characterized as a ring, and the ring is a guard ring surrounding the wafer holder.

10. An apparatus according to claim 1, wherein said annular structure is characterized as a ring, and the ring is disposed proximate to an interior surface of the apparatus, so that the magnetic field is effective to deflect charged particles incident on said surface.

5 11. An apparatus according to claim 10, wherein said surface is of a material susceptible to erosion during the plasma processing, so that the magnetic field reduces said erosion.

12. An apparatus for plasma processing of a wafer, comprising:

a wafer holder;

an electrode opposite the wafer holder; and

10 at least one of a shield ring surrounding the electrode, a guard ring surrounding the wafer holder, and a ring proximate to an interior surface of the apparatus, including a magnet generating a magnetic field for deflecting charged particles incident on the ring, thereby preventing damage to the ring by said particles.

13. An apparatus according to claim 12, wherein the magnet comprises a magnetic material embedded in the ring. -

15 14. An apparatus according to claim 12, wherein the ring has a groove formed therein, and the magnet is disposed in the groove.

15. An apparatus according to claim 12, wherein the magnet is a permanent magnet.

16. An apparatus according to claim 12, wherein the magnet is an electromagnet.

20 17. An apparatus according to claim 12, wherein the ring is of a material susceptible to erosion during the plasma processing, so that the magnetic field reduces said erosion.

18. An apparatus according to claim 12, wherein the apparatus comprises a ring proximate to an interior surface of the apparatus, and said surface is of a material susceptible to erosion during the plasma processing, so that the magnetic field reduces said erosion.